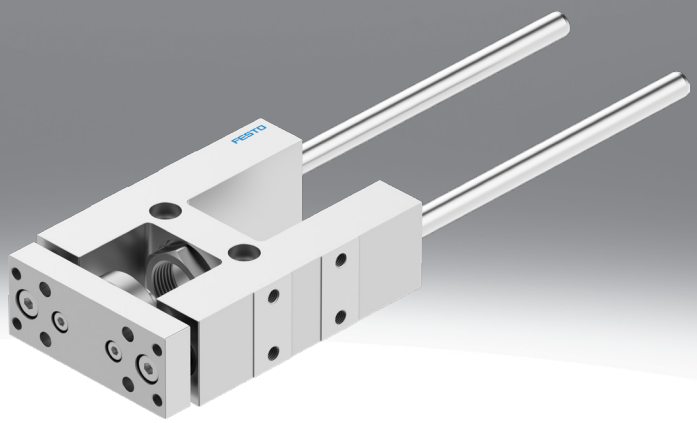
Guide unit, metric FEN



Characteristics

At a glance Link fen

The guide units FEN are used to protect round cylinders DSNU against torsion when these are subjected to high torque loads. They offer a high level of guide precision for workpiece handling and other applications.

There are two guide variants to choose from:
- [GF] Plain-bearing guide
- [KF] Recirculating ball bearing guide

Position sensing:
- By using proximity switches, any position can be detected.
- For round cylinders DSNU, a mounting kit is required to sense the end positions.

Diagrams Link fen

The diagrams shown in this document are also available online. These can be used to display precise values.

Type code

001	Series	
FEN	Guide unit for standards-based cylinder to ISO 6432	

002	Size	
12/16	12/16 mm	
20	20 mm	
25	25 mm	

003	Stroke range [mm]	
...	1 ... 250	

004	Guide	
GF	Plain bearing	
KF	Recirculating ball bearing guide	

Datasheet

General technical data			
Size	12/16 mm	20 mm	25 mm
Stroke	1 ... 200 mm	2 ... 250 mm	
Design	Guidance		
Guide	Plain-bearing guide Recirculating ball bearing guide		
Displacement force	15 N		
Type of mounting	Via female thread		
Mounting position	optional		
Ambient temperature	-20 ... 80°C		

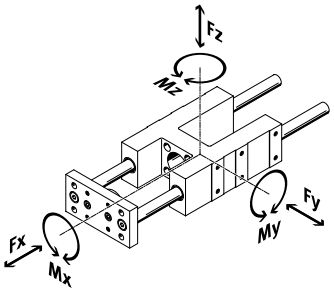
Weight						
Size	12/16 mm		20 mm		25 mm	
Guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide
Basic weight for 0 mm stroke	490 g	429 g	873 g	828 g	866 g	813 g
Additional weight per 10 mm stroke	12 g					
Moving mass for 0 mm stroke	161 g		269 g			
Additional moving mass per 10 mm stroke	12 g					

Centre of gravity of the moving mass			
Size	12/16 mm	20 mm	25 mm
Centre of gravity at 0 mm stroke	40 mm	42 mm	
Centre of gravity additional of moving mass per 10 mm	4.9 mm	4.7 mm	

Materials						
Size	12/16 mm		20 mm		25 mm	
Guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide
Material housing	Anodised wrought aluminium alloy					
Material guide component	High-alloy steel	Tempered steel	High-alloy steel	Tempered steel	High-alloy steel	Tempered steel
Material yoke plate	Anodised wrought aluminium alloy					
Note on materials	RoHS-compliant					
LABS (PWIS) conformity	VDMA24364-B2-L					

Datasheet

Load values



The indicated forces and torques refer to the centre of the guide.

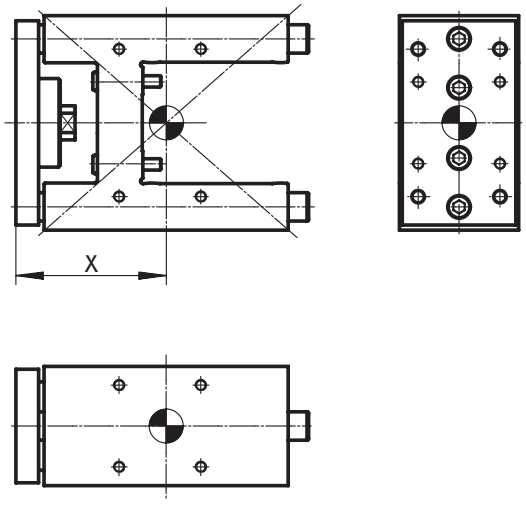
Size	12/16 mm	20 mm	25 mm
Max. force Fy static	830 N		
Max. force Fz static	830 N		
Max. torque Mx static	20 Nm	24 Nm	
Max. torque My static	12 Nm	31 Nm	
Max. torque Mz static	12 Nm	31 Nm	
Max. force Fy	520 N		
Max. force Fz	520 N		
Max. moment Mx	12 Nm	15 Nm	
Max. moment My	7 Nm	20 Nm	
Max. moment Mz	7 Nm	20 Nm	

Load characteristics – Calculation of the load comparison factor

$$f_v = \frac{|F_{y1}|}{F_{y2}} + \frac{|F_{z1}|}{F_{z2}} + \frac{|M_{x1}|}{M_{x2}} + \frac{|M_{y1}|}{M_{y2}} + \frac{|M_{z1}|}{M_{z2}} \leq 1$$

If the guide unit is subjected to two or more of the indicated forces and torques simultaneously, the following equation must be satisfied in addition to the indicated maximum loads:

Load parameters – position of the centre of the guide

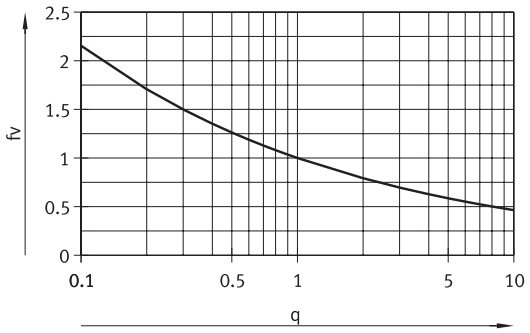


Distance X:

- FEN-12/16-...-KF: 68 mm
- FEN-20 ... 25-...-KF: 69 mm

Datasheet

Calculating the service life



The service life of the guide depends on the load. To provide a rough indication of the service life of the guide, the graph below plots the load comparison factor fv against the service life ratio q.
These values are only theoretical. You must consult your local contact at Festo for load comparison factors fv greater than 1.5.

Load comparison factor fv as a function of service life ratio q:

Example:
The effect on the service life, deviating from the specified reference service life, can be determined using the service life ratio q:

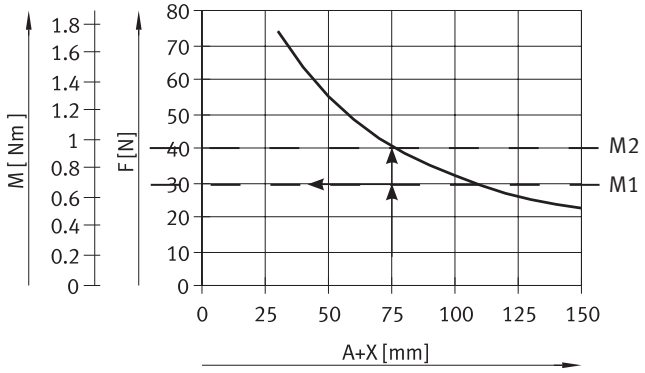
Where:
Reference service life = 5000 km
Required service life = 3000 km

q = (3000 km / 5000 km) = 0.6

The graph shows a load comparison factor fv of 1.2. This means that the permissible total load can be utilised up to 120%.

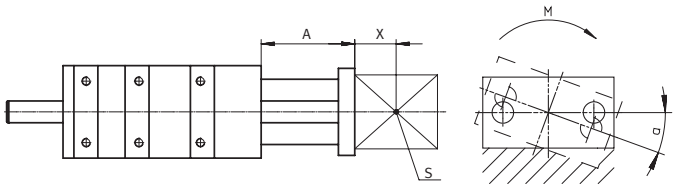
fv > 1.5 are only theoretical comparison values.

Max. payload F and torque M as a function of projection A –Explanation of how to read the graphs in the case of a combined load



- Determine projection (75 mm)
- Enter proportion of payload (30 N)
- Enter distance from curve
- Permitted torque is the difference between M2 and M1

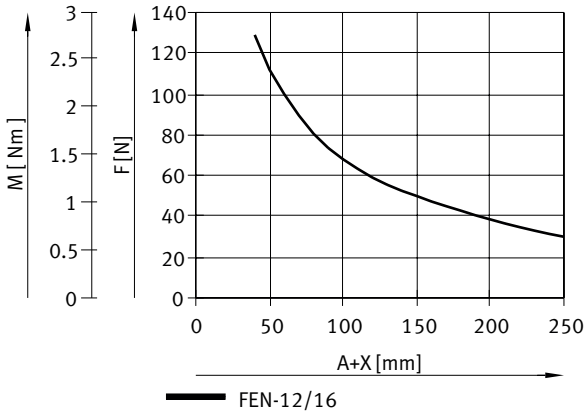
Max. payload F and torque M as a function of projection A – FEN-...-GF



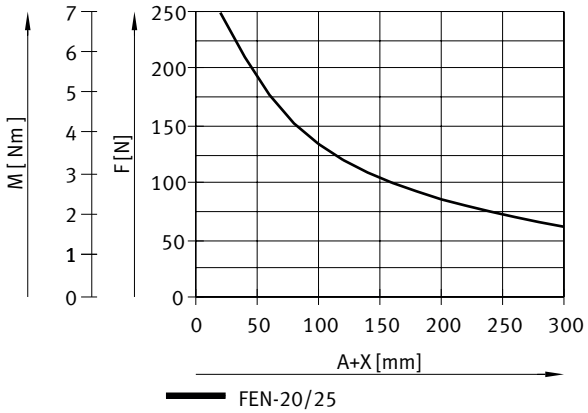
A = projection
X = distance to the centre of gravity of the payload
S = centre of gravity of the payload
M = torque

Datasheet

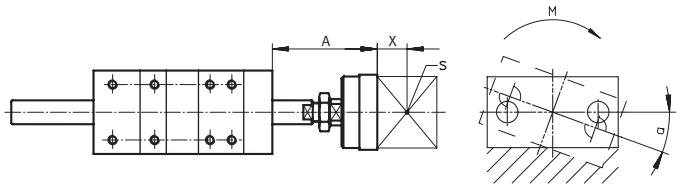
Max. payload F and torque M as a function of projection A – FEN-12 ... 16-GF



Max. payload F and torque M as a function of projection A – FEN-20 ... 25-GF



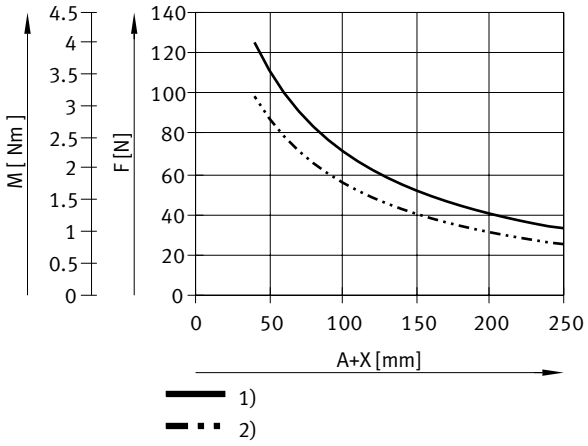
Max. payload F and torque M as a function of projection A – FEN-...-KF



A = projection
X = distance to the centre of gravity of the payload
S = centre of gravity of the payload
M = torque

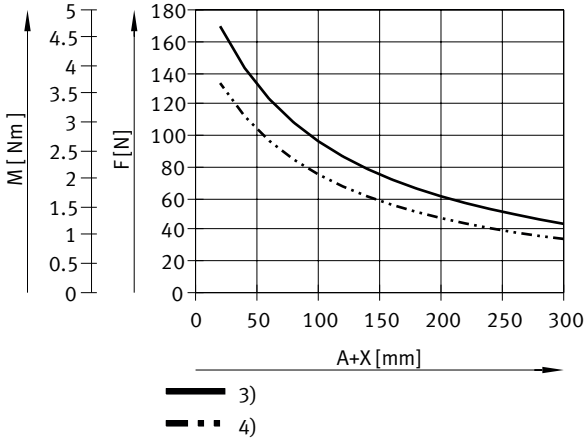
Datasheet

Max. payload F and torque M as a function of projection A - FEN-12 ... 16-KF



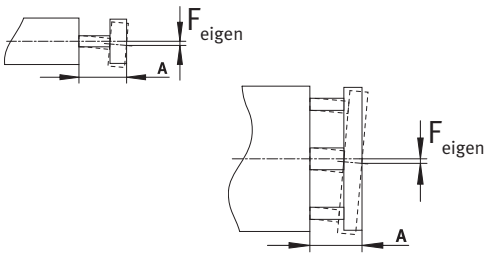
1) Running performance of 1500 km
2) Running performance of 3000 km

Max. payload F and torque M as a function of projection A – FEN-20 ... 25-KF



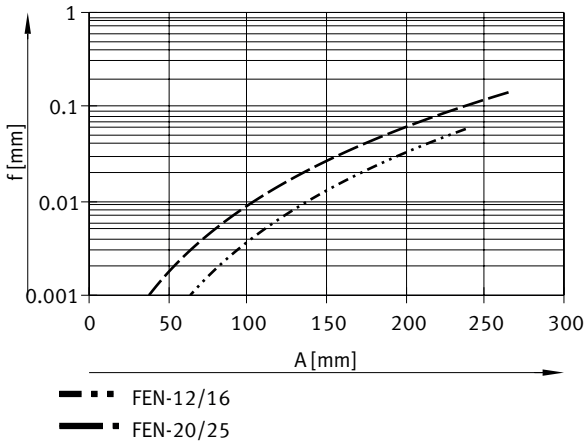
3) Running performance of 5000 km
4) Running performance of 10000 km

Deflection Ftare (due to tare weight) as a function of projectionA

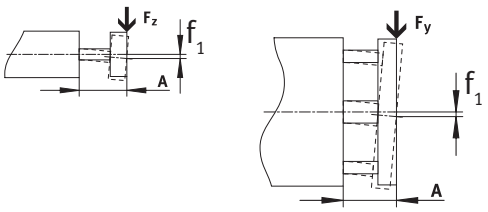


Datasheet

Deflection Ftare (due to tare weight) as a function of projection A – FEN-12 ... 25-GF/KF



Deflection Fstandard (due to lateral force) as a function of projectionA



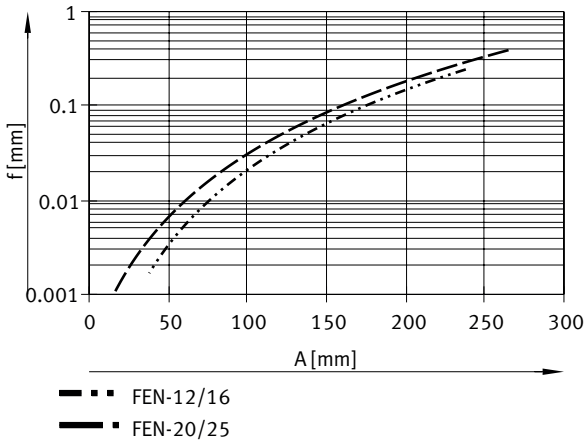
The maximum permissible lateral force must not be exceeded.

f1 = (F1/F2)*f2

F2 = 10 N

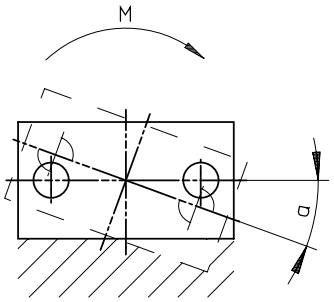
A = projection for guide rod
f1 = deflection due to lateral force
F1 = lateral force
F2 = standardised lateral force
f2 = deflection due to standardised lateral force (value from graph)

Deflection Fstandard (due to lateral force) as a function of projection A – FEN-12 ... 25-GF/KF



Datasheet

Incline a1 (due to torque) as a function of projection A

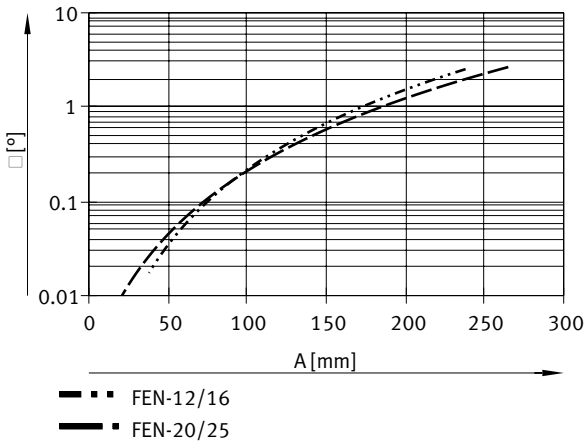


a1 = (M1/M2)*a2

M2 = 2 Nm (valid for ≤ 10°)

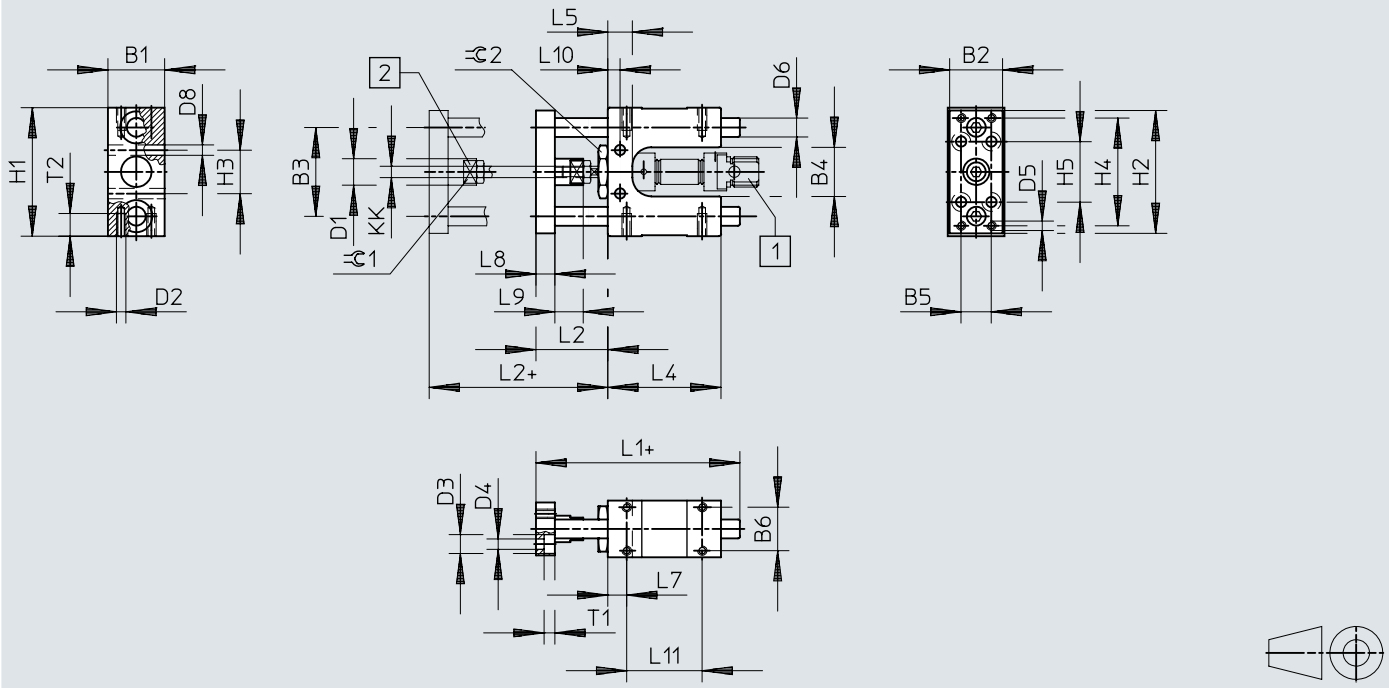
A = projection for guide rod
a1 = incline due to torque
M1 = torque
M2 = standardised torque
a2 = deflection due to standardised lateral force

Incline a1 (due to torque) as a function of projection A – FEN-12 ... 25-GF/KF



Dimensions

Dimensions – FEN-12 ... 16 Download CAD data www.festo.com



[1] Cylinder DSNU
[2] Compensating coupling for radial and axial alignment
[3] + = plus stroke length

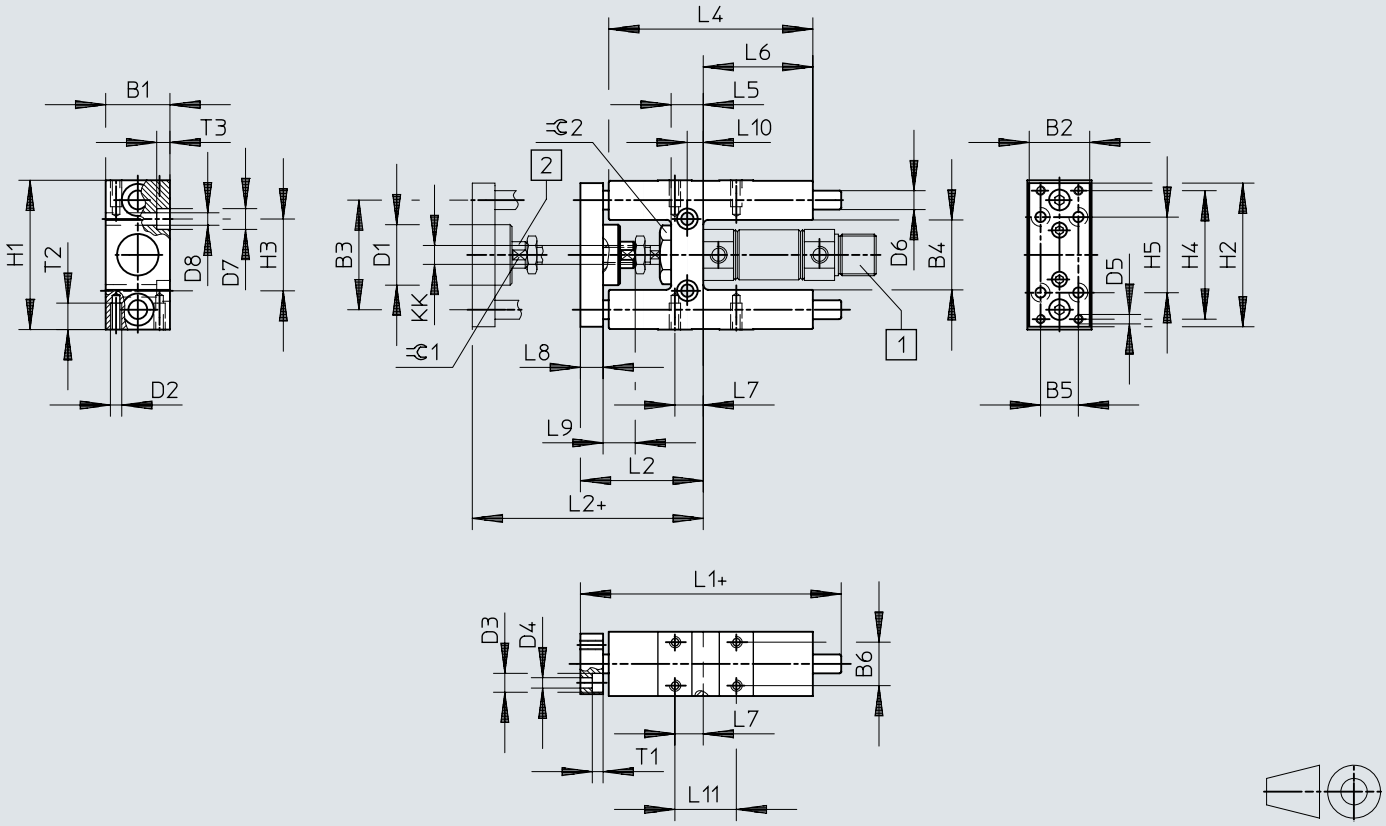
	B1 –0,3	B2	B3 ±0,15	B4	B5	B6 ±0,15	D1 Ø	D2	D3 Ø	D4 Ø	D5	D6[1] Ø	D8 Ø	H1 –0,4	H2	H3 ±0,15
FEN-12 FEN-16	30	28	47	26	16	23	14	M5	10	5,5	M5	10	5,5	68	65	23

	H4	H5	KK	L1	L2 +5	L4	L5	L7	L8	L9	L10	L11 ±0,15	T1	T2	⌖1	⌖2
FEN-12 FEN-16	57	32	M6	108	38	60	13	10	10	15	6,5	40	5,7	12	12	24

1) FENG-...-GF: Tolerance class h8, FENG-...-KF: Tolerance class h7

Dimensions

Dimensions – FEN-20 ... 25 Download CAD data www.festo.com



[1] Cylinder DSNU
[2] Compensating coupling for radial and axial alignment
[3] + = plus stroke length

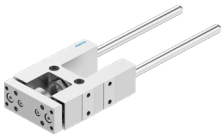
	B1 –0,3	B2	B3 ±0,2	B4	B5	B6	D1 ø	D2	D3 ø	D4 ø	D5	D6[1] ø	D7 ø	D8 ø	H1 –0,4	H2	H3 ±0,2	H4
FEN-20	34	32	58	37	20	23	32	M6	10	5,5	M5	10	11	6,6	79	76	38	68
FEN-25																		

	H5	KK	L1	L2 +5	L4	L5	L6	L7	L8	L9	L10	L11 ±0,2	T1	T2	T3	=C1	=C2
FEN-20	40	M8	138	65	108	17	58	15	12	22	8,5	32,5	5,7	14	6,8	13	27
FEN-25		M10x1,25								17							

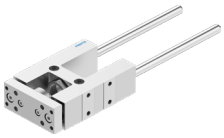
1) FENG-...-GF: Tolerance class h8, FENG-...-KF: Tolerance class h7

Ordering data

FEN-...-GF – variable strokes

	Size	Stroke	Part no.	Type
	12/16 mm	1 ... 200 mm	**19168**	**FEN-12/16- -GF**
	20 mm	2 ... 250 mm	**19169**	**FEN-20- -GF**
	25 mm		**19170**	**FEN-25- -GF**

FEN-...-KF – variable strokes

	Size	Stroke	Part no.	Type
	12/16 mm	1 ... 200 mm	**33481**	**FEN-12/16- -KF**
	20 mm	2 ... 250 mm	**33482**	**FEN-20- -KF**
	25 mm		**33483**	**FEN-25- -KF**

FEN-...-GF – fixed strokes

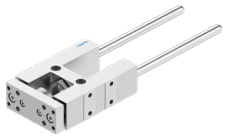
	Size	Stroke	Part no.	Type
	12/16 mm	40 mm	**8204041**	**FEN-12/16-40-GF**
		80 mm	**8204042**	**FEN-12/16-80-GF**
		100 mm	**8204043**	**FEN-12/16-100-GF**
		125 mm	**8204044**	**FEN-12/16-125-GF**
		160 mm	**8208450**	**FEN-12/16-160-GF**
		200 mm	**8204045**	**FEN-12/16-200-GF**
	20 mm	50 mm	**8204046**	**FEN-20-50-GF**
		100 mm	**8204047**	**FEN-20-100-GF**
		125 mm	**8204048**	**FEN-20-125-GF**
		160 mm	**8204049**	**FEN-20-160-GF**
		200 mm	**8204050**	**FEN-20-200-GF**
		250 mm	**8204051**	**FEN-20-250-GF**
	25 mm	50 mm	**8204052**	**FEN-25-50-GF**
		80 mm	**8204053**	**FEN-25-80-GF**
		100 mm	**8204054**	**FEN-25-100-GF**
		125 mm	**8204055**	**FEN-25-125-GF**
		160 mm	**8204056**	**FEN-25-160-GF**
		200 mm	**8204057**	**FEN-25-200-GF**
		250 mm	**8204058**	**FEN-25-250-GF**

FEN-...-KF – fixed strokes

	Size	Stroke	Part no.	Type
	12/16 mm	50 mm	**8204025**	**FEN-12/16-50-KF**
		80 mm	**8204026**	**FEN-12/16-80-KF**
		100 mm	**8204027**	**FEN-12/16-100-KF**
		125 mm	**8204028**	**FEN-12/16-125-KF**
		160 mm	**8204029**	**FEN-12/16-160-KF**
		200 mm	**8204030**	**FEN-12/16-200-KF**
	20 mm	50 mm	**8204031**	**FEN-20-50-KF**
		250 mm	**8204032**	**FEN-20-250-KF**
	25 mm	25 mm	**8204033**	**FEN-25-25-KF**
		50 mm	**8204034**	**FEN-25-50-KF**
		80 mm	**8204035**	**FEN-25-80-KF**
		100 mm	**8204036**	**FEN-25-100-KF**
		125 mm	**8204037**	**FEN-25-125-KF**
		160 mm	**8204038**	**FEN-25-160-KF**

Ordering data

FEN-...-KF – fixed strokes

	Size	Stroke	Part no.	Type
	25 mm	200 mm	**8204039**	**FEN-25-200-KF**
		250 mm	**8204040**	**FEN-25-250-KF**

Accessories

Mounting kit SMBR-8-... – for round cylinder DSNU-...-A

	Size	Part no.	Type
	12	★ **175093**	**SMBR-8-12**
	16	★ **175094**	**SMBR-8-16**
	20	★ **175095**	**SMBR-8-20**
	25	★ **175096**	**SMBR-8-25**